

The second part of M. Wurtz's book, dealing with Valency, is not, in our opinion, of equal value with the first.

After reading these chapters one finds it hard to find a reason for introducing into science the conception of valency, so variable and shifting is this property of atoms made to appear.

On p. 229 it is stated that chlorine is monovalent in  $\text{HClO}$ , pentavalent in  $\text{HClO}_2$ , and heptavalent in  $\text{HClO}_3$ .

Scarcely a hint is given of the many objections to extending considerations concerning valency, in any but a most tentative manner, to non-gasifiable bodies. The theory of molecular as distinct from atomic compounds is dismissed; all are regarded as atomic, and the valencies of the atoms seem variable at pleasure. Where proof of the valency of atoms is not forthcoming, assertion is used in its place.

The author's treatment of affinity is not satisfactory. "Affinity is the force of combination, chemical energy." "Atoms attract each other, and this atomic attraction is affinity." "Thus we know that while hydrogen is united to chlorine with extreme energy, oxygen combines with less force." Surely the translator is to blame for some of these sentences.

The theory of valency deserved a more rigorous and exact treatment than M. Wurtz has given it.

We leave the book, feeling that it is the production of a brilliant author, not the work of a deep thinker.

M. M. P. M.

#### NEW ZEALAND MOLLUSCS

*Manual of the New Zealand Mollusca.* By Frederick Wollaston Hutton, F.G.S. Published by command. (Wellington, 1880.)

IN an interesting article which appeared in NATURE, vol. xxii, p. 461, entitled "The New Zealand Institute," attention was called to the publications of the Institute and to the excellent work in science achieved by the author of the manual above mentioned, and by many other naturalists, as well by geologists, chemists, astronomers, archæologists, physicists, and philosophers. When the traditional New Zealander visits the ruins of the old country, it is to be feared that he will lament our ignorance instead of expressing his admiration of our past eminence.

Prof. Hutton seems to have contributed to the publications of the Institute a number of valuable papers on "the various divisions of the fauna of New Zealand." We are not quite sure that our knowledge of any one department of the fauna would be so much advanced by a multifarious zoologist as by a specialist who has devoted himself to the study of that department. The division of labour is not less desirable in natural history than in other equally extensive fields of work. The material is so vast that a Linné, Buffon, or Cuvier would be now rather an anachronism than a marvel.

The present work is called "A Systematic and Descriptive Catalogue of the Marine and Land Shells, and of the soft Mollusks and Polyzoa of New Zealand and the adjacent Islands." It belongs to the Colonial Museum and Geological Survey Department, of which Dr. Hector, the well-known geologist, is the director. Its scope is

most useful; and, as the preface by Dr. Hector very properly states, "an accurate knowledge of the affinities and distribution of the recent shells of New Zealand is a very necessary element in the geological survey of the country, as it must form the basis of our Tertiary geology, upon the correct deciphering of which many questions of the highest interest depend." And he adds, "Shells afford the most reliable data for palæontologists; but before the extinct shell-fauna can be utilised, the recent shells of the area must be thoroughly determined." This is quite true. We are disposed, however, to carry the process a step further. It is not enough to determine or make out the recent shells, but they must be critically compared with their fossil analogues. For want of such comparison the late Prof. Nyst, M. Vandenbroeck, and other Belgian palæontologists have unfortunately caused some confusion by a wrong identification of recent or living species with Tertiary species.

The "Manual" contains 237 pages. There are no plates or illustrations. It appears to comprise all that is known of the subject, and to have been conscientiously and on the whole carefully written. But, like all other books, it is not faultless. In the Bibliography "Linneus" is the name given as the author of the 12th edition of the "Systema Naturæ." It ought to be "Linné," according to the title-page and dedication. "Gastropoda" is now the usual, as well as correct, spelling of the class, not "Gasteropoda." The shell of the family *Patellidae* is not a simple cone, but is spiral in the young. The *Bullidae* are not all eyeless. The sub-order "Lucinacea" is described as having the gills, "one on each side"; but in one of the families of this sub-order there are "two gills on each side." The family "*Radulidae*" is stated to have the foot "not byssiferous"; *Limahians* with its foot spins a byssus and makes its curious nest. In the "Artificial Key to the Marine Shells" the remarkable class *Solenocoenchia* (or as Prof. Hutton in another place prefers to call it, "Scaphopoda") is omitted. The shell in "*Capulidae*" is described as "not spiral." These and other less important errors can be corrected in a future edition. We regret, but are not surprised, to see the remark that "not much dependence can be placed on the localities in Mr. Cuming's collection," which was purchased for the British Museum at a large price. This is the case with all dealers, and it sadly disturbs our ideas of geographical distribution. We are inclined to question even such species as *Ostrea edulis*, *Mytilus edulis* and *Lucina (Loripes) divaricata* as indigenous to New Zealand. These are included in a list of sixty-four species believed by the author to be the only New Zealand species of which there is evidence that they are found anywhere else, although he admits that the identification has in most cases been made solely by descriptions and figures. The same remark applies to *Cypraea europaea*, "*Philippia lutea*" = *Solarium hybridum*, *Littorina caerulea* = *ueritoides*, and *Crepidula unguiformis*. But, *per contra*, the *Saxicava australis* of Lamarck is scarcely a variety of *S. rugosa*, Linné. The diagnosis of the soft parts, or "animal," of *Vitrina* and *Succinea*, viz., "too large to enter the shell," does not suit the European species of those genera. In the family *Assiminiidae* the eyes are placed not "on the middle of the tentacles," but on their tips. "*Odostomia lactea*" is not the Linnean species of

*Turbo*, but another species so named by Mr. Angas. Nor is the *Nucula sulcata* of A. Adams the same as Bronn's much older species of that name. But a serious defect of the work consists in the description of the shells. We give one instance among many. *Littorina novæ zealandiæ* is described as "somewhat globosely turbinated," with the whorls "spirally irregularly linearly grooved;" and the characters of the several species are not arranged systematically or in any kind of sequence. Dog-Latin would be almost preferable to such English. Perhaps, however, the description of species made by the late Mr. Reeve may have been copied from his "Conchologia Iconica." Prof. Hutton says that there are "between 300 and 400 species" of the New Zealand mollusca and polyzoa. This is considerably less than half the number of those species which have been recorded as inhabiting the British seas. J. GWYN JEFFREYS

### OUR BOOK SHELF

*The Zoological Record for 1878*; being vol. xv. of the Record of Zoological Literature, edited by E. C. Rye. (London: John Van Voorst, 1880.)

THIS publication seems to pursue the even tenor of its very useful way. The editor has to acknowledge grants of 250*l.* towards the expenses of the work from the British Association for the Advancement of Science, the Royal Society, and the Zoological Society of London. The "Record of the Arachnida for 1878" has been unavoidably postponed until vol. xvi., and Mr. Kirby has for the future undertaken all of the groups of the Insecta with the exception of the Coleoptera, which the editor will still review. Entomologists will perceive with regret that they thus lose the services of Mr. McLachlan, who has reported on the Neuroptera and Orthoptera since 1869. A special committee has been appointed to expedite the publication of the annual volume, and arrangements have been made, both as regards the contributors and printers, which it is hoped will have the eventual effect of bringing out the record of one year's work during the succeeding year. This would be an immense boon, and though it is obvious that it cannot be effected at the first attempt, still the editor confidently expects that the Record of 1879 will be published in the beginning of 1881, and let us hope that ere the end of that year we may also have the Record of that one now coming to a close.

### LETTERS TO THE EDITOR

[The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts. No notice is taken of anonymous communications.]

[The Editor urgently requests correspondents to keep their letters as short as possible. The pressure on his space is so great that it is impossible otherwise to ensure the appearance even of communications containing interesting and novel facts.]

### The Recent Gas Explosion

ON my return after the vacation the experiments on the explosion of gases in tubes were continued.

A tube was constructed by winding narrow strips of paper helically round a glass tube about 8 mm. in diameter; two-thirds of the width of the paper being glued, it was so wound as to make a tube of three thicknesses of paper. The interior of the tube was afterwards varnished with shellac. At the ends short pieces of glass tube about 5 mm. in diameter were fixed, one being provided with platinum wires in order to inflame the gas; the total length of the tube was 4360 mm.

The tube was filled with a mixture of oxygen and hydrogen, the end of the glass tube with the wires was plugged with wet cotton wool, the other tube being closed with an india rubber

cap; a spark was then passed. At a distance of 650 mm. from the open end, at which the ignition took place, the outer covering of the tube was split; at a distance of 1,900 mm. from the same point was a hole, at 3030-3040 another hole, and at 3085-3100 a third hole. The india-rubber cap was blown off the end of the tube. At the third hole the interior coating of the tube was torn and blown back towards the opening, showing that the orifice had allowed the escape of gas from both directions. Measuring the distances between the holes and the ends of the tube, we have the following numbers:—From end to first split, 650 mm.; from split to first hole, 1250; from first hole to mean of second and third, 1200; from this point to end of tube, 1260.

There seemed to be some doubt as to the uniformity of this tube, so another was made by rolling a strip of paper helically along a glass tube in such a manner that the edges did not overlap. A glued strip was wound over this so as to cover the joint; and a third to cover the joint of the second, the edges not overlapping and yet touching one another throughout. The process was very tedious, and as the result showed, not successful. This tube was 7.5 mm. in diameter, and the glass ends 4.5, the total length being 8390 mm. The end of the tube farthest from the wires was finally closed, after introducing the explosive mixture. When the gas was exploded in the tube 14 holes were made, in some places the tube giving way at joints, but without any great tear of the paper. Starting from the end of the tube the first hole was at 620 mm., the other holes being distant from one another 650, 530, 100, 475, 375, 320, 580, 455, 370, 885, 2115, 365, 85, and the other end 465 from the last hole.

A third tube was now constructed, but on a different principle. A sheet of glued paper was wound round a brass tube and at once removed; in this way a tube about 275 mm. long and 13.5 wide, and consisting of about 5 layers of paper was obtained. Thirty-two of these were joined end to end by glueing narrow strips of paper round the joints. The tube was varnished inside and out, and when completed was 9000 mm. long. The experiment was made after dark, and it was not found out until afterwards that a small quantity of water had entered the tube from the gas-holder while introducing the gas. In this case the explosion made 10 holes, but the joints obviously considerably strengthened the tube in their neighbourhood. The distances between the holes were not more regular than in the previous case. From the end to first hole 757 mm.; the other holes being distant 660, 1595, 146, 484, 230, 295, 308, 1325, 585, to end 2615. The end was not opened by the explosion.

Although these experiments have not exhibited the regularity I anticipated, they show that a tube burst by an explosive mixture must not be expected to open along its whole length.

Cooper's Hill, October 25

HERBERT MCLEOD

### Geological Climates

I WAS not surprised at reading Mr. Duncan's letter in supposed reply to my communication to NATURE, vol. xxii. p. 532, as it fully proves my case against the slipshod logic of geologists in general. He writes:—"Where I now write, on the Bagshot sands and gravels of Cooper's Hill, facing the cold north with a touch of the east, there is a patch of bamboo canes in full leaf. They were in full leaf at this time last year. The plant survived out of doors the extreme frost and fogs of last winter and other evidences of a temperate climate, and it has been in beautiful leaf all this summer."

"Now everybody knows that in torrid India the bamboo grows . . ."

Mr. Duncan might as well have told your readers that where he now writes, "facing the warm south with a touch of the west," he beheld before his astonished eyes a tuft of grasses.

He has not named the *species* of the "patch of bamboo canes" which delighted his eyes, and which "everybody" knows came from "torrid India."

If Mr. Duncan does not know, at least "everybody" does, that species of the bamboo canes flourish in every latitude from Northern China to Southern Chili, including "torrid India," where in some places you may have a half-inch thick of ice, in consequence of the starlight radiation of a clear summer's night.

I have before me a list of twenty-four species of bamboo canes cultivated in most of the gardens of Europe, but they are all, with the exception of a species from the Himalayas (not "torrid India"), imported from the severe climates of Northern Japan and China.